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LIGATURE OF SUBCLAVIAN ARTERY FOR AXILLARY ANEURISM.

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ROBERT L., æt. 49 years, was admitted under my care into the Manchester Royal Infirmary on December 8, 1887.

HISTORY.—Twenty years ago he had syphilis with secondary symptoms. He had always worked as a joiner. His health appears to have been good until last June, when he noticed a "nagging" pain in the right axilla, at its lower part, after his day's work was over. The pain was intermittent and did not prevent his working. About a month later he noticed a swelling which slowly increased until three weeks ago; since that time its progress has been more rapid. There has never been any swelling of the arm. He ceased working eight weeks ago.

CONDITION ON ADMISSION.—The patient is a tall large-framed man, somewhat spare but not unhealthy looking. There is a large tumor to be seen and felt in front of the axilla on the right side; the swelling is about the size of a cocoanut, and reaches from the floor of the axilla to the clavicle, and can be also felt in the posterior triangle projecting upwards behind the clavicle; there is a space of a clear inch or more between the swelling and the posterior border of the sterno-mastoid. Pulsation is well marked and expansile; there is no distinct bruit. On light pressure over the third part of the subclavian

artery a distinct thrill is felt. Any attempt at firm compression of the vessel is very painful, and checks pulsation very little; neither does it appreciably alter the size of the aneurism. The right radial pulse is perhaps slightly weaker than the left. There is pain in the lower part of the tumor as well as over the external surface of the arm, and the middle, ring, and little fingers. Pulsation in the left subclavian is very distinct. His arteries are markedly rigid. On examination by Dr. Reynolds, our resident medical officer, he reports "The cardiac apex beat is in the fifth space slightly external to the nipple line, there is no thrill, there is slightly increase of the deep cardiac apex dulness. The dull area over the upper third of the sternum is slightly increased on each side almost as far as the costo-chrondral margin, beyond this the percussion note is normal. Over the whole cardiac region there is a loud to and fro murmur every where of the same quality, it is most marked at the second right costal cartilage. A similar murmur is heard over the carotid, the sounds in the left carotid are normal." Dr. Reynolds is of the opinion that there is dilatation of the aorta with consequent incompetence of the valves. The man's pupils are both much contracted and equally so; this appears to be a condition of long standing, his sight has been weak as long as he can remember; the pupils do not react to reflex stimulation, and the palpebral fissures both seem to be contracted. No patellar reflex can be obtained,there is no ankle clonus; the man says he is more unsteady in the dark than he used to be. Urine, sp: gr. 1018, acid, no albumen or sugar.

The patient was kept in bed and given 20 grain doses of iodide of potassium three times daily with $^1/_4$ gr. of morphia at night, and $^1/_6$ in the morning, to relieve his pain. On Dec. 12, the aneurism was distinctly larger than it was on admission. and the pulsation was much more forcible. On the 13th, the girth round the axilla was $19^1/_2$ inches as compared with 19 inches on the 12th, and the pulsation was still more forcible. The arm had been bandaged to the side, but as this increased the pain the patient released it. Ligature of the third part of the subclavian was arranged for the next day. On the night of the 13th the man was delirous.

December 14. The patient was brought into the theatre anæsthetized, and a 5 inch incision was made in the usual way, one or two subcutaneous vessels were divided, the external jugular vein was hardly seen and was not in the way, the omo-hyoid was exposed and drawn upward, the lower cord of the brachial plexus was then taken as the guide, and the artery was tied with a chromic gut ligature (No. 4), with very little disturbance of the surrounding structures. The scalenus anticus was not found to be a very good guide, inasmuch as the tense fascia stretching from its posterior border to the sheath of the artery obscured the line of the muscle and as the artery although deeply placed rose fairly high in the neck, the scalene tubercle was not of any value as a steering point either. The needle was passed from without inward, the subclavian vein was not seen, the suprascapular vein was just seen lying behind the clavicle, but was not in the way, no other vessels of any size were exposed. On tightening the ligature the aneurism at once collapsed, and pulsation in it and at the wrist ceased. The wound was powered with iodoform and boracic acid, (equal parts) and closed except for a rubber drainage tube, the spray was used and a wood-wool dressing applied, the whole limb was wrapped in wool and the patient removed to bed. I had the advantage of the kind assistance of Mr. Thomas Jones during the operation.

The subsequent history of the patient, as far as the aneurism goes was absolutely uneventful, the limb was never cold, there was practically no pain, the aneurism remained collapsed, and no pulsation returned in the arm. Morphia was given freely to keep the man quiet, as the delirium which appears before the operation continued and got worse at night. He remained in this state till the 16th, when he was so violent and restless that he had to be strapped down, while chloral and bromide mixture was substituted for the morphia, but with no better result. On the 17th his general condition was poor, the tongue was getting dry and his strength failing, temperature 98°, he was ordered ℥vi of brandy and a dose of the chloral and bromide every two hours until he slept. 18th. General condition poor, he seems to be failing, pulse in the left wrist weak and irregular, tongue dry and rough, tempera-

ture 97.6°. He slept all night and takes a good quantity of milk; there is diarrhœa, He was ordered fish, chicken and all the nourishment he could take. The wound was dressed for the first time, it was all healed except the drainage opening; the tube was removed, the aneurism was nearly completely collapsed and there was no pulsation, some firm clot could be felt in the sac. The chloral was stopped.

December 20. Patient was very restless all day yesterday, the diarrhœa has ceased to-day. In addition to his six ounces of brandy, he is taking six ounces of brandy mixture, and an ammonia mixture. His temperature which had been sub-normal since the 18th, remained as low as 97° throughout the 20th. The pulse (in left radial) was very irregular.

December 21. He had a much quieter night, takes a fair amount of nourishment, the temperature is still subnormal and the pulse very weak and irregular, there are at times twitchings of the first and second fingers of the left hand. Delirium with various delusions has lasted all the time since the night before the operation. On the 24th the temperature rose to 99.4° but again fluctuated, not being normal till January 3, 1888. The general condition steadily improved, but his mental state was most unsatisfactory ; he was quiet but had delusions ; this was, however, improving on his discharge January 18. At this time the aneurism was perfectly well.

This case has been given in considerable detail, since it presents many points of interest. The aneurism was large, and rapidly increasing, its walls were thin and it contained apparently very little clot, there was general arterial degeneration with a dilated aorta, considerable evidence of locomotor ataxy, and the night before operation, delirium. Under these very unfavorable conditions was ligature the best treatment? Pressure was impossible; medical and dietetic treatment obviously insufficient. Amputation, the old operation, the introduction of wire, etc., into the sac, and manipulations, electrolysis, etc., were all rejected, though consent was obtained for amputation should it become necessary at the time of the operation in consequence of any casualty. Amputation was considered to be out of the question, first because the disease extended to behind the clavicle and the vessel would have had to be

ligatured in the posterior triangle as well ; and secondly, because it was thought to be an unnecessarily severe measure. The extent of the sac precluded the use of the old operation, and the results of the other methods are not sufficiently encouraging to lead me to apply them where ligature is possible. Happily the artery at the seat of ligature was apparently fairly sound, and the operation being aseptic no wound complication was introduced. The next anxiety, gangrene, never threatened. The mental condition appeared probably due to brain lesions, the result of bis damaged vessels ; it was clearly not due to the operation, to the anæsthetic or the iodoform, since it began before the operation. The low temperature and weak and irregular pulse were, I thought, best explained by supposing that some clotting took place in the dilated aortic arch, and this, perhaps, also contributed to the brain disturbance. The correctness of this opinion was shown by the autopsy. The great prostration caused much anxiety, and I feared that there was too much general visceral degeneration to allow him to recover, though the quality of his urine was fairly good.

The operation itself was, I should say, a moderately easy one; the clavicle did not come down well, and the vessel lay deep, but there were no important overlying veins, and the arch rose pretty high above the rib.

It is worth noting that the course of the third part of the subclavian is vertical when it rises high in the neck, and horizontal when this is not so, so that the needle in the one case is passed from without inward, (or vice versa), and in the other from below upward, (or vice versa). As pointed out to me by Professor Young when I was examining some bodies before operation, the artery is most readily reached by taking the lower cord of the brachial plexus as a guide, and sometimes the cord will be found quite overlying the artery. This is a much better method than the old one of taking the scalenus; at least, so I have found it.

The association of syphilis, locomotor ataxy, aneurism and hard work, (he did much planing) is well seen in this case.

I am indebted to Dr. Reynolds and Mr. Bannister (house sur-

geon), as well as to Mr. T. Porter for help in recording the case.

After his return home, the man improved and his mental condition became natural, but in little more than a week he began to complain of pain in the chest. The pain increased, and became very severe, and he died February 12, death being due to the aortic disease. The axillary aneurism gave rise to no trouble.

The man's home was 20 miles away, but I obtained leave for a post mortem ; this, however, was limited to removal of the heart and the parts connected with the aneurism. The heart was large, mitral and tricuspid valves both thickened, but not otherwise markedly abnormal. The aorta was dilated and about twice its size in the ascending and transverse parts of the arch. The pulmonary artery was much dilated. The heart tissue was fairly good. As had been suspected, there was a large firm clot occupying nearly half the calibre of the aorta, and reaching from close above the valves to the orifice of the left carotid artery. The aneurismal sac measured three inches by one and a half inches, it was filled with clot, which was firm and laminated at the periphery, but somewhat soft and loose in the centre. At the lowest point of the aneurism was a small secondary sac as it were, as if another small aneurism was grafted on to the large one. The artery was completely occluded from the origin of the thyroid axis to the aneurism, a distance of about an inch. In the neighborhood of the ligature, the knot of which remained, was a cavity about the size of a large cobnut, which contained broken down blood. The cords of the brachial plexus were firmly adherent to the sac of the aneurism.

The operation may thus be considered to have been entirely successful as far as the cure of the aneurism goes. but what share it took in causing the aortic clot is doubtful. Unless the artery had been tied, it seems probable that the aneurism would have speedily ruptured, since its growth was very rapid just before the operation.